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Implementation Of Smartphone Navigation Features By Combined Forces In Determining The Hazards Of Terrorism In Poso

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Abstract

The presence of armed terrorist groups in Poso can threaten security conditions in the country, because their activities are considered quite dangerous for the surrounding community. This terrorist group did not hesitate to kill civilians who tried to deny its existence. Therefore, various joint military operations have been launched to crush this armed terrorist group, such as: Camar Maleo and Tinombala. However, until now this terrorist group is difficult to completely destroy, due to the condition of the operating area in the form of dense tropical rainforest and steep slopes. This makes it difficult for troops to carry out chases and hunting. Through smartphone technology, troops are able to read operating field conditions much more easily and can predict far-field conditions in front of them more quickly. The concept used is the incorporation of raster data, vectors and DEM which are processed using GIS (Geographic Information System) software with smartphone devices based on Android. The result is a smartphone device that has been inserted geospatial-based data used by troops in the operating field in the hunt for terrorists.

Keywords: Military Operations, Geographic Information System, Smartphone Technology.

INTRODUCTION

The hunt for the Santoso terrorist group has not been fully resolved, because it still leaves one of the leaders of a terrorist group named Ali Kalora and several members of his group. Although it has no influence as big as Santoso, who was killed in the Tinombala operation. However, Ali Kalora also has advantages in terms of affiliations with terrorist groups in Mindanao

(Philippines) and Bima (West Nusa Tenggara).

The TNI-POLRI Joint Force continues to look for the presence of Ali Kalora and his followers, but the traces of this terrorist group are difficult to detect. This terrorist group deliberately moved and was able to hide in the dense jungle. In addition, the heavy terrain that must be passed also makes the search process more difficult to do. Moreover, the joint forces serving in Poso often experience exchanges with the new troops on duty. As a result, the ability to read the terrain conditions in the operating area is very limited.

Beginning The digital age created the latest innovations in helping carry out the task of joint forces in the operating field. Initially the troops on duty were equipped with GPS Navigation such as: Garmin GPS 62s, Garmin 63s, Garmin eTrex Touch 35, and Montana 680. Navigation in closed terrain can utilize an Android-based smartphone device. All terrain data in raster, vector and DEM (Digital Elevation Model) operating areas can be combined with these smartphone devices. The use of smartphone devices can certainly be more effective and efficient, because most soldiers are used to using them and are easily operated.

METHODS OF RESEARCH

This research is explorative in the form of three-dimensional modeling and geospatial analysis of modified slope data. The general description of research activities from the beginning to the end, can be illustrated in broad outline through the flow of research activities that have been systematically designed below [Figure. 4].

Initial research activities, starting with collecting references and scientific sources that can be used as references, information related to research can be sourced from trusted online sources, reading books, and scientific journals. The reason for using online resources is that there have not been many similar studies that have been developed for the military. In addition, the problems raised by the author are mostly found in online writing sources.

Next is the collection of data needed in supporting research. The data collected in the form of: High-resolution Satellite Image Data and DEM Data (Digital Elevation Model). The data that has been processed with the GIS (Geographic Information System) device is used to solve various problems related to the implementation of troop mobilization in the RI-Malaysia border region in Kalimantan.

Smartphone devices can be combined with spatial data from processing results that

are in shapefile (shp) and pdf format. Through an android-based offline gps application, navigation in carrying out security mobilization and patrol can be done without relying on internet connections. An example of an application that can be used is Avenza Maps, this application has an attractive and easy display for customization.This research is the initial stage in the development of closed terrain navigation methods, so that in the future new ideas are expected to emerge that can complement various shortcomings in this study.

THEORETICAL FRAMEWORK

Literature Review

The researcher tried to find references related to the research topic, so that reference sources were found that were considered capable of helping researchers to carry out research. There are main points that are of particular concern to researchers, including: Security Patrols Constrained by Terrain Conditions of the Extreme Earth Surface, Spatial Data Models, and Android Offline GPS Application Integration. The following will be briefly described.

Security Patrol Constrained by Extreme Terrain Conditions. Terrain forms on the surface of the Poso region are dominated by steep hills and mountains, in addition there is also very thick vegetation cover of tropical rain forests. So that patrol can only be carried out within a limited radius. Soldiers carrying out security patrols in border areas are hampered by landscape barriers in the form of steep and steep slopes. Based on the theory put forward by Van Zuidam in 1985, there are several classes of slope that can be classified [Table.1].

Spatial Data Model. Spatial data has the meaning as a data that refers to positions, objects, and relationships including in the space of the earth. Spatial data is one item of information, wherein there is information about the earth including the surface of the earth, below the surface of the earth, waters, the ocean and under the atmosphere (Rajabidfard and Williamson, 2000). The use of the geospatial data model is indeed not quite popular in the military, certainly more due to a lack of Human Resources (HR) with a background in the field of geography or geodesy. One simple spatial data model that can be used is by utilizing Digital Elevation Model (DEM) data. This data has many advantages, especially for making terrains in 3 dimensions and making the slope class. The following is an example of DEM data that has been processed [Figure. 1] and [Figure. 2].

Offline Android GPS Application. Smartphone technology has developed very rapidly and has been widely used by the public, as evidenced by the release carried out by the digital marketing research agency Emarketer, which stated that in 2018 the number of active smartphone users reached 100 million people. Indonesia's position is the fourth largest in the world after China, India and America. The integration of the spatial model into the smartphone device in question is a spatial data synchronization method that has been processed into an offline GPS application based on android. The offline GPS application has the ability to update real time positions without internet connection. An example is the Avenza Maps application. The offline GPS feature on smartphones has many advantages compared to handheld GPS navigation (Garmin 62s or 63s). The advantage lies in the ease in the data customization process, so that spatial data in shapefile (shp) and pdf format can be entered into a smartphone device [Figure. 3].

RESULT AND ANALYSES (Research Articles) / ANALYSES (Opinion Articles)

This research produces various kinds of outputs derived from derivatives from DEM (Digital Elevation Model) data, including contour data and slope grade data. Therefore, a type of DEM data is needed that has good spatial resolution, so that the accuracy of detailed topographic elevation data can be obtained with a resolution that can reach below 0.25 meters.

Combination of Topographic Maps and DEM (Digital Elevation Model). The picture above is a display of the results of the data input process in GIS (Geographic Information System) software. The above DEM data has AOI (Area of Interest) in the Republic of Indonesia-Malaysia border region of North Kalimantan. If we look at it, the difference between the lowlands and the hills can be seen clearly and the borders of the country are always on the igir or hilltops. This can be taken into consideration by the commander of the forces in planning troop mobilization towards the boundary line, because carefulness is needed in determining which segments will be passed.

Topographic maps are a type of map that becomes a standard for troops and absolutely must be possessed before conducting an assignment operation, especially in the border region. Sometimes for ordinary people do not have the ability to interpret the map, so that the display of maps that are too complicated will increasingly confuse the warrior in navigating in a closed field. The combination of Topographic Maps and DEM is the first step to simplify the map

interpretation process, where the appearance of Topographic Maps will look closer to the actual conditions in the field [Figure. 5] and [Figure. 6].

Simulation of the Troop Mobilization Plan. Utilization of a combination of Topographic Maps and DEM data can be made a simulation of troop mobilization, for example the troops move from the Start Point to the Target there are several recommendation lines available, the task is to determine which path is more effective and efficient in achieving the target [Figure. 7]. The results show in the first track simulation, the distance traveled is 10.11 km and the elevation is between 125 m - 625 m. It can also be seen that in the first 2.5 km the slope is the greatest, so the soldiers need to consider saving energy and logistics in traveling a distance of 10.11 km. In addition, it can be obtained an overview of any segment that needs to be slowed or accelerated based on the graph analysis above [Figure. 8].

The results show the first path simulation, the distance traveled as far as 9.93 km and the elevation between 125 m - 625 m. Although the distance traveled is much closer, it should be noted when you are at a distance of 3 km - 5 km. Soldiers will have difficulty passing through the up and down fields and will drain a lot of energy.

Both simulation 1 and simulation 2 are a means of consideration for the commander in planning mobilization towards the target to be achieved, so that the forces are more effective and efficient in mobilizing. The results shown in simulation 1 look more effective and efficient than simulation 2. This makes simulation 1 the best choice in the plan for mobilizing troops.

Transfer to Android App Offline GPS. The best tracking path simulation can be transferred to each soldier's smartphone device in the field, so that the best route guideline that has been planned will appear. Based on the experience of researchers while carrying out assignments in the border region along with border security forces, the use of this android-based offline gps application is more in demand than conventional GPS. There are a number of underlying reasons, including: easy to use by ordinary people, a more attractive appearance, rich in modification features, and the average device is owned by soldiers [Figure. 9]. This study uses a Base Map in the form of a Topographic Map of the Poso region, which is usually used as the main map in border security activities. The input results on smartphone devices show success and can be used by soldiers on duty in the field to

achieve the specified target.

Figures

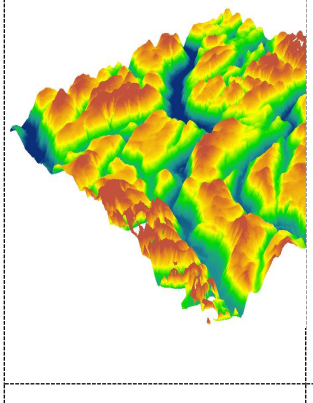

Figure 1. DEM Data Model

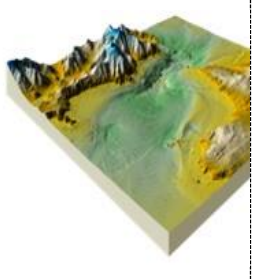

Figure 2. DEM Data Model

Figure 3. Offline GPS application.

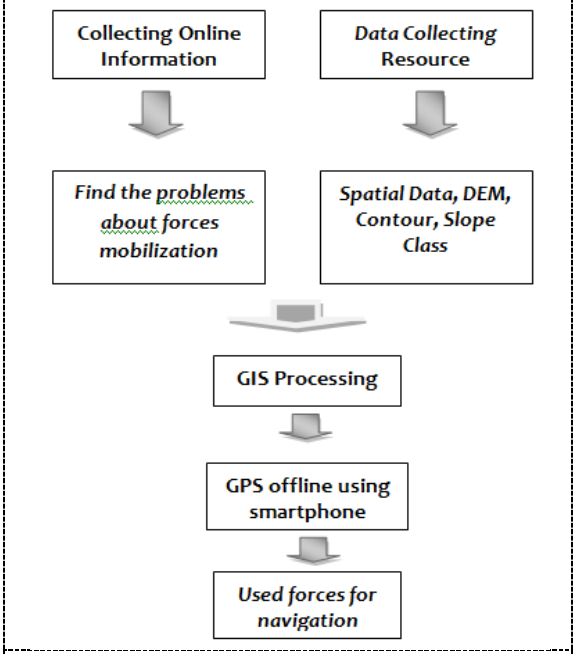

Figure 4. Research flow chart.

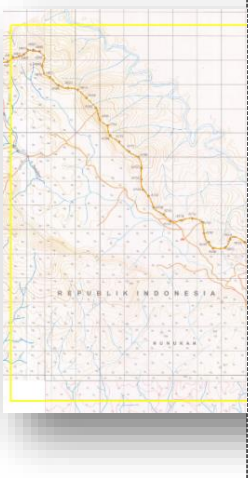

Figure 5. Topographic Maps

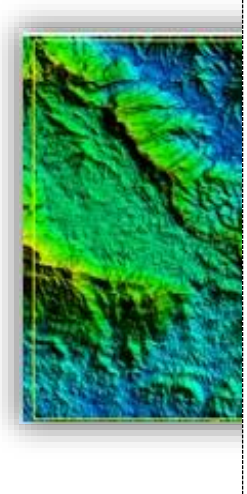

Figure 6. DEM Data Model

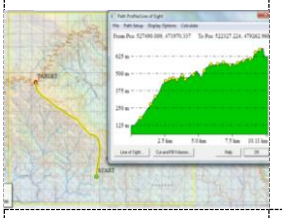

Figure 7. Navigation Path Simulation 1

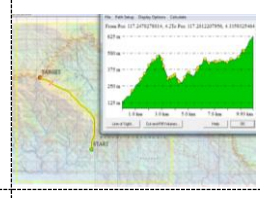

Figure 8. Navigation Path Simulation 2

Figure 9. Map Display on a Smartphone

Table 1. Slope Class (Van Zuidam in 1985)

Slope grade	Topo graphy	Explanation
0-2° (0-2 %)	flat	Flat or almost flat, no erosion big ones, can be processed easily in dry conditions.
2-4° (2-7 %)	declivous	The land has a sloping slope, in the event of a landslide move with low speed, erosion and erosion will leave a very scar in.
4-8° (7-15 %)	sloping	The land has a sloping slope to steep, if there is a landslide moving at low speed, very prone to erosion.
8-16° (15-30 %)	rather steep	The land has a slope which is steep, prone to danger of landslides, surface erosion and groove erosion.
16-35° (30-70 %)	steep	The land has a slope which is steep to steep, frequent erosion and ground motion with speed slowly. Vulnerable area erosion and landslides
35-55° (0-2 %)	very steep	The land has a slope which is steep, often found outcrops rocks, prone to erosion.
>55° (>140%)	very very steep	The land has a slope which is steep, rock outcrops appear on surface, prone to landslides rock.

CONCLUSION

Researchers can draw conclusions about

research conducted on the use of smartphone technology for troops in closed terrain, especially the Poso region.

- This research method is suitable for troops who mobilize in closed fields and there is no GSM signal.
- Making tracking or navigation paths adjusted to DEM (Digital Elevation Model) data and information on Topographic Maps.
- The use of smartphones as a navigation aid is far more effective and easier than conventional GPS.
- The results of research and trials show success, so that it can be used for soldiers who are on duty in the field.

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